

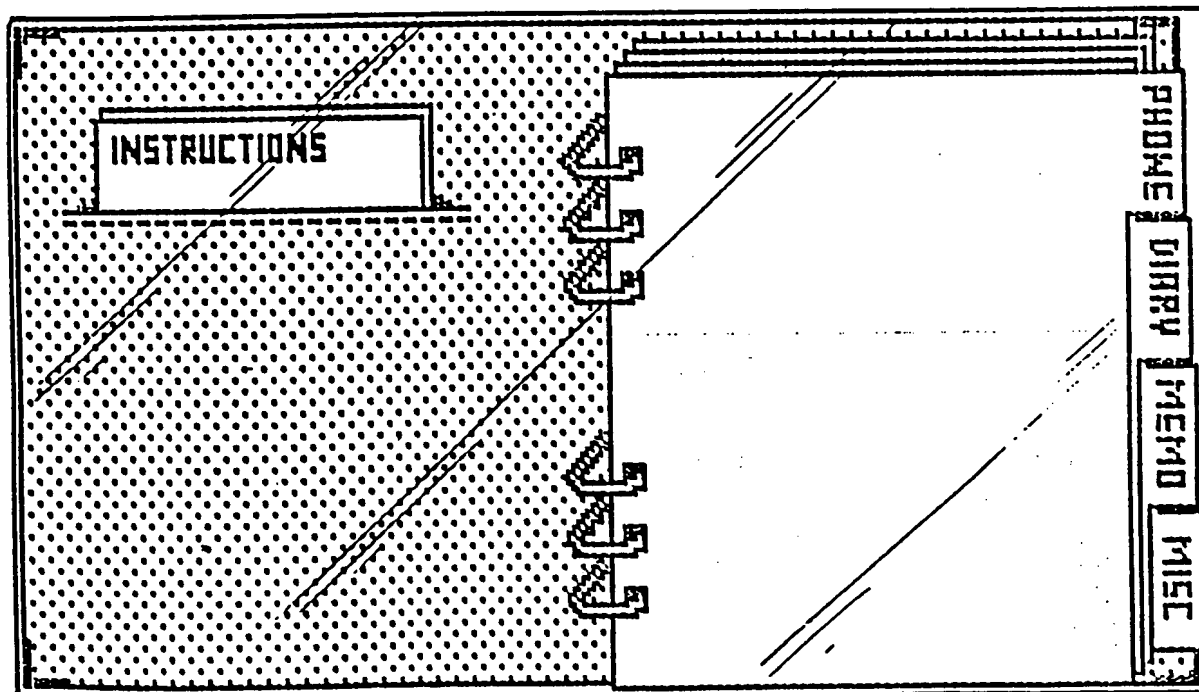


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(54) Title: ELECTRONIC PERSONAL ORGANISOR



(57) Abstract

This invention describes an electronic personal organisor with a display providing graphics representing a conventional personal organisor and further having a translucent Indium Tin Oxide graphics tablet overlying the display.

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- 1 -

ELECTRONIC PERSONAL ORGANISOR

BACKGROUND OF THE INVENTION

50 FIELD OF THE INVENTION

This invention relates to an electronic personal organisor and in particular to an electronic personal organisor which can provide the same functions as a conventional personal organisor.

10 The term conventional personal organisor used herein refers to a compact hand held loose leaf binder into which may be inserted a number of pages which are obtainable in a variety of printed formats. For instance, a set of pages forming a year diary may be obtained, as may be a set of pages forming an A-Z address section. In addition to these conventional features, other pages, for instance maps, events calendars, and personal expenditure cost sheets may be obtained. Consequently, the conventional personal organisor has become in recent years a popular and to some indispensable medium for recording information. The term electronic personal organisor refers to an electronic device which can provide the functions of a conventional personal organisor.

An essential ingredient for the usability of such conventional personal organisers is the familiarity of their appearance to a user. The familiarity is based not only on the arrangements of alphanumeric visual cues, but on additional visual cues presented to the user. When looking at a conventional personal organisor open at, for instance, a page of the address section, the alphanumeric visual cues comprise cues specifying what sort of data is to be written in, for instance

- 2 -

the alphanumeric visual cue may be the letter "A" at the top of a page specifying that surnames beginning with the letter "A" should be entered on that page. Such cues may be essential to both render the data meaningful, in that they give the context of the data, and to facilitate data retrieval. For instance, an entry in the address section is only readily retrievable because of the organisation of sections each corresponding to a letter of the alphabet, and will only be appropriately entered in the first place because of the cues to the user to input the name in its appropriate section. It is, however, essential that there are not only these alphanumeric cues derived from the column of letters of the alphabet running along one edge but also further cues deriving from for example, the following features; the provision of each letter of the alphabet on a sequential arrangement of single tabs; the overlaying a sheath of pages being divided into sections with each section having as its first page a page with such a tab, these cues being indicative of the organisation of the pages; the ring binders indicative of the manner in which pages may be turned over; and also the features which trigger the recognition in the user that the user is faced with paper upon which, his experience informs him, he can write with a pen or pencil.

Without these cues the user may not only not be able to readily use the address section, he may actually not recognise it as an address section at all. When the user recognises that what is before him is a depiction of an address section comprised of a number of pages and readily appreciates the manner in which he may use it there can be said to be a sufficiency of visual cues.

The term "representational graphics" used

- 3 -

herein refers to a depiction displayed by a device which to a user sufficiently represents the appearance of a number of printed pages such as are used in a conventional personal organiser and which are together organised in the same manner as pages in a conventional personal organiser so that the nature and mode of use of the device would be readily apparent to that user, i.e. depictions which provide a sufficiency of visual cues.

10

DESCRIPTION OF PRIOR ART

Portable computers are known which provide a variety of desirable notebook features such as diary or address book functions. Generally, information input is achieved through an alphanumeric keyboard. Consequently, input of information is not only somewhat slow but is also limited solely to alphanumeric text.

20

It is also known to provide arrangements for converting the position of a manually operated writing or tracing member into an electrical signal. For instance, transducer pads are known which provide electrical signals representing the co-ordinates of a point at which pressure is applied locally, by a stylus, to a writing surface of the pad.

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Generally, such a writing surface is a flexible electrically resistive membrane separated from an electrically conductive base so that the pressure applied by the stylus results in electrical contact between the membrane and the base. Each pair of opposing edges of the membrane may have a voltage applied so that when pressure is applied by the stylus the potential of the base at the contact point is indicative of a position co-ordinate of the stylus. Consequently, continuous monitoring of the

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- 4 -

position of the stylus during writing or drawing is possible, allowing the simultaneous reproduction of the writing or drawing at a remote location and the digitising and storing of the writing or drawing in a digital frame store. Commonly, such arrangements are used in computerised design and computer graphic systems having substantial memories and processing power.

In addition, it is known to lay a transducer pad over a display panel to provide a touch screen. EP-A-0271280 discloses a personal computer based system using such an arrangement, which displays typographical arrangements corresponding to forms. The computer generates a number of user prompts, for instance highlighting a field in the form to be filled in and providing a menu of alternatives for insertion in that field. It will be appreciated that what is displayed are not representational graphics within the meaning of the term as defined herein.

Further reference may be made to GB-A-2145547 which discloses an electronic memo device comprising a transducer pad, display panel and keyboard. The purpose of the keyboard is to allow the input of indexing data to be associated with handwritten data input using the transducer pad. No representational graphics are utilised in this device whatsoever. The operating procedures required to use the product are also neither immediately familiar nor even readily learnt; the user/device dialogue is both unnatural and complicated. This is a major disadvantage when compared to the familiarity and ease of the use of a conventional memo device, i.e. printed memo pad.

SUMMARY OF THE INVENTION

In accordance with the present invention, an

- 5 -

electronic personal organiser comprises means for generating signals to provide predetermined representational graphics, display means for displaying the graphics, input means comprising a transducer pad and a member manually operable to be positioned in dependence on the representational graphics displayed to thereby co-operate with the pad, means for converting the position of the member into electrical signals indicative of the position of the member with respect to the pad, means for driving the display means comprising means for utilising said electrical signals in forming an image on the display, and means for storing the electrical signals in dependence on the representational graphics displayed.

Consequently, not only may the user input any graphic information he chooses to be reproduced by the display means but he may also achieve the input in a way that is both familiar and entirely natural since representational graphics are utilised. The graphics depict pages, including the information signifying the function of those pages, in a format familiar from conventional personal organisers as well as conventional diaries and address books, for example. Furthermore, the graphics provide further visual cues such as, for instance, derive from the depiction of the overlaying of adjacent pages and the depiction of ring binders. Consequently, what is actually seen by the user is an image which may, by the sufficiency of visual cues, be immediately recognised as a depiction of, and thus associated with, a conventional personal organiser.

Accordingly, the invention is predicated on the insight that an electronic personal organiser may be made which is as easy and familiar to use as a conventional personal organiser if representational

- 6 -

graphics are used. An electronic personal organisor in accordance with the present invention will have numerous advantages over a conventional organisor, not only in terms of data storage capability but in terms of the further inventive features referred to below.

Conveniently, the means utilising said electrical signals may be arranged to allow selection of a required operational mode in dependence on the representational graphics displayed. For instance, the display may provide the appearance of an open conventional personal organisor open at the front page, beneath which page appear the edges of a sheath of pages, some having tabs on which appears an indexing word e.g. "DIARY", signifying a particular operational mode. Selection of the required mode is then effected by positioning the manually operable member so that it co-operates with the pad to produce the required electrical signal. The positioning of the member is in dependence upon the position of the relevant tab as displayed. The term operational mode used herein refers to the manner of operation. For instance, when in the "address" operational mode, the organisor is operating as an address book by displaying representational graphics depicting a conventional organisor open at its address section. The edges of a sheath pages is displayed beneath a front page having a tab indexed by the letter "A". further tabs are shown defining sections of the sheath and each marked by a letter of the alphabet.

Preferably, the transducer pad overlays the display means so that a given portion of an image on the display lies substantially below the position on the pad at which the member co-operates with the pad to result in the electrical signals utilised in forming the given portion. This greatly facilitates

- 7 -

the ease and familiarity with which the apparatus may be used. Thus, where a page with a tab marked "diary" is displayed, the user need only touch the region of the pad overlaying the tab for the "diary" operational mode to be selected.

Similarly, when the address section is entered by pressing the "address" tab, and the user wants to look at the "B" section of addresses, the member may simply be touched upon the tab with a letter "B" for the first page of the "B" section of addresses to be displayed.

Preferably, the means for generating predetermined graphics is arranged to provide representational graphics depicting a page or pages turning over, after the selection of a required operational mode or pages within a mode and before the display of representational graphics associated with the selected mode or page.

It will be appreciated that this greatly enhances the user-friendliness of the organiser by providing further familiar visual cues as to the working of the organiser.

In accordance with another aspect of the present invention, an electronic personal organiser for electronically displaying simulated pages representative of a loose-leaf booklet arranged into various sections comprises

a display screen;

display means programmed to generate a display on the display screen representative of a menu displaying available sections of said booklet and representative of printed information associated with different pages of said available sections;

memory means;

input screen means including an input tablet for generating positional information when the latter

- 8 -

is contacted by a stylus, whereby, when any one page available for display is displayed on the screen, handwritten information inputted via the input tablet is displayed on the display screen and is also stored in said memory means for subsequent recall in association with said any one page; and

control means, associated with said display means and said memory means, operable to change the display on the display screen to switch the display between the menu and pages of any one selected section of the menu and, when a page of a section is on display, to sequence through the pages of that section as required, any one page displayed on the display screen at any one time depicting both the representative printed information associated with that page and any handwritten information associated with that page and stored in the memory means.

Preferably, the control means includes control regions of the input tablet which, when contacted by a stylus effect the said change of display, the control regions being arranged to be positioned over visual cues generated by the display means for display on the display screen.

It will be appreciated that the display is preferably a display of representational graphics as hereinbefore defined.

BRIEF DESCRIPTION OF THE DRAWINGS

An embodiment of the invention will now be described with reference to Figure 1 of the drawings, which is a plan view of an electronic personal organiser in accordance with the present invention, Figure 2 which is a schematic block diagram illustrating the major circuitry of the electronic personal organiser, Figures 3-6a which depict typical

- 9 -

representational graphics which may be displayed by the display means of the device, and Figure 7 which depicts a simplified flow chart illustrating the operation of the organiser.

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DETAILED DESCRIPTION

Referring now to Figure 1, a display means, indicated generally at 1, preferably comprising an LCD type display 2, is shown hingedly attached to a lid indicated generally at 5. An input means comprises a translucent transducer pad 3, overlying the display 2. The pad 3 may be a membrane type sensor operable to provide an electrical signal indicative of the position on the pad 3 at which pressure, in excess of a predetermined threshold press, is applied by a manually operated member, here shown as a pen type stylus. Further arrangements (not shown) of transducer pad 3 may prove convenient. For instance, the manually operated member 4 may be operable to provide a voltage signal to the pad 3, the pad 3 having sensors arranged to provide an electrical signal indicative of the position of the pad in dependence upon the voltage measured by said sensors.

It is preferable to have a pad with a slightly roughened surface so that the stylus does not slip and to more closely duplicate the feeling of pen writing on paper.

The display means 1 and lid 5 are arranged to close together to form a compact and portable unit which may be readily opened for use as an electronic personal organiser.

The stylus 4 may comprise first and second portions 6 and 7 respectively, with which contact may be alternatively made with the pad 3. Contact with

- 10 -

the first portion 6 results in electrical signals which may be utilised in forming an image, whereas contact with the second portion 7 results in electrical signals which may be utilised in deleting an image. A variety of arrangements may be provided to enable discrimination between contact by the first and the second portions 6, 7 of the stylus.

It will be appreciated that an internal power supply and a variety of electronic components are contained within the device. It will also be appreciated that the detailed electronic design would be a routine matter for one skilled in the art.

Referring now to Figure 2, the transducer pad 3 is shown schematically overlaying the LCD type display. The transducer pad 3 is of a type known as an Indium Tin Oxide (ITO) pad and is operable to supply a signal indicative of the x-y co-ordinates at which the stylus 4 has touched the pad 3. The operation of the pad, for example the manner in which it converts the position of the stylus to electrical signals indicative of the x-y co-ordinates, is well known and will not be further described herein.

The electrical signals from the pad 3 are supplied to an A to D converter 11 feeding a data path or system bus 10. A CPU 12 is connected for bidirectional data flow to the bus 10, as is a RAM 17. A ROM 18 is also connected to bus 10, being programmed with the operating and application programmes for the organisor, which are executed by microprocessor or CPU 12. CPU 12 provides all control signals via bus 10. RAM 17 stores the user input in locations dependent upon the displayed graphics associated with the input. RAM 17 may be a non-volatile device such as an EEPROM or magnetic bubble memory, such as the 4 megabit 7114 manufactured by Intel Corp. CPU 12 may be a powerful

- 11 -

microprocessor such as the Z80 manufactured by Zilog Microcomputers or the 8088 manufactured by Intel Corp. A rechargeable battery pack (not shown) provides the power required by the various components such as CPU 12 and ROM 18. In addition there is provided an EIA RS-232 serial interface 19 connected to bus 10 for the inputting and offloading of data. For instance, interface 19 provides a convenient means for communicating to a printer (not shown). Alternatively, the CPU 12 may include both ROM 17 and RAM 18, in which case the CPU 12 not only generates the signals to the display driver 14 which result in representational graphics being displayed, but also stores the digital signals from the A to D convertor 11 in predetermined locations according to the representational graphics displayed and with which the resulting image must of course be associated. A display driver 14 connected to bus 10 drives the LCD display 2 which is preferably a supertwist type display or a neutralised twisted nematic display.

A smart card reader 15 may be provided and provide input to the bus 10 so that information stored on a smart card may be accessed and displayed. The reader 15 may either be integral with the device and thus connected to bus 10 (as shown) or may be an optional component accessing bus 10 via the interface 19. This allows a number of additional modes to be catered for by the present invention. For example, a smart card containing a microprocessor programmed as a full function calculator may be provided, in which case a display of a keyboard of a full function calculator plus display would be shown. The user would operate the calculator by pressing the keys of the keyboard in the same way as if using a real calculator. For some applications, the card may comprise essentially only a memory chip

- 12 -

preprogrammed with specific information. For instance, the card may contain maps or other specialised information. There may also be an additional memory store 16 into which the information stored in the RAM 17 may be downloaded. This additional memory store 16 is removable for secure keeping so that should the associated electronic personal organiser be lost then the memory store 16 may be used to transfer its contents into a further electronic personal organiser. It will be appreciated that this is a significant advance over that possible with a conventional personal organiser. Memory store 16 may be integral with the device and connected to bus 10 (as shown) or may be an optional component accessing the bus 10 via interface 19.

The use of the device will now be described with reference to Figures 3 to 6a and Figure 7. On opening the lid 5, which automatically turns the device on, there is shown (step 21) on display 2 the depiction of Figure 3. It will be appreciated that the representational graphics illustrated provide the appearance of a conventional personal organiser and that the user will at once be familiar with that presented to him.

The user may then touch (step 23) the pad 3 using stylus 4 overlaying the region of screen 2 of interest. For instance, if the user touches (step 24) the region demarcated within the boundary to the word "instructions", i.e. the portion representing an instruction booklet, then a set of instructional notes (not shown) will be displayed (step 26) on the screen for a short while before reverting to the Figure 3 depiction. Alternatively, should the user touch (step 25) the region of the pad overlaying an indexing tab, for instance the display of the tab

- 13 -

marked "diary", then the telephone directory section will appear to be turned over (as illustrated in Figure 3a), (step 27) and the diary mode will then be entered with the display of the appearance of a conventional personal organiser opened at its diary section (as illustrated in Figure 4). Should the user not touch the tablet or pad within 5 seconds (step 29) of the initial depiction of the organiser opened to show its contents as shown in Figure 3, then there may be displayed (step 28) the comment "Please either touch tab marking section required or touch instruction leaflet". If there is still no touch from the user after 40 seconds then the organiser automatically shuts off (step 22). Once in a section the display may be headed by four command words: "contents", "page <<", "page >>" and "eraser". Should the user touch a command word then the command is carried out (step 32), for instance touching the command word "contents" (step 29) (it will be understood that the user is in fact only touching the ITO pad 3 immediately overlaying the portion of the LCD screen displaying "contents") and the display will revert back to that displayed in Figure 3. Should the user touch "page <<" then successive pages of the section will be displayed with the intervening pages appearing to be turned over, as illustrated by a diary in Figure 4a. Figures 4b and 4c illustrate alternate layouts of the diary from that shown in Figure 4a and 4b. Similarly, should the user touch an indexing tab (step 30) (for instance a particular address section within the address pages) then that section will be scrolled to and displayed (step 27). Valid touch points are therefore points overlaying indexing tabs, command words. Similarly, so are points which can reproduce the user input, i.e. points corresponding

- 14 -

to paper in the representation. Should no valid touch point be pressed then after 5 seconds the comment (step 31) "Please write on the paper or touch a command, eg touch page >> and the pages will scroll forward" will appear.

Figures 5 and 5a illustrate the display when the apparatus is in the address book mode.

Figures 6 and 6a illustrate the display when the apparatus is in the memo pad mode.

To input information, the user simply uses the stylus 4 as if it were a pen and the ITO pad 3 a sheet of paper. The screen 2 will darken under areas of the pad 3 touched by the stylus 4 for regions which are valid touch points for reproducing graphical input. Graphical input (such as writing) will be converted to a digital locating signal via the A to D converter 11 (step 33) and then stored in the RAM 17 (step 34) and also displayed (step 35) on the display.

All previously entered input can be recalled together with the relevant representational graphics, which of course render the input locatable, by entering the appropriate mode and scrolling forwards or backwards through the pages as hereinbefore described. In addition there is provided an "ERASER" function. Should the user touch "ERASER" then any input to which the stylus is touched will disappear and be erased from storage.

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- 15 -

CLAIMS:

- 5 1. Electronic personal organiser comprising means for generating signals to provide predetermined representational graphics, display means for displaying the graphics, input means comprising a transducer pad and a member manually operable to be
10 positioned in dependence on the representational graphics displayed to thereby co-operate with the pad, means for converting the position of the member into electrical signals indicative of the position of the member with respect to the pad, means for driving
15 the display means comprising means for utilising said electrical signals in forming an image on the display and means for storing the electrical signals in dependence on the representational graphics displayed.
- 20 2. Electronic personal organiser as claimed in Claim 1 wherein the means utilising said electrical signals are arranged to allow selection of a required operational mode in dependence on the representational graphics displayed.
- 25 3. Electronic personal organiser as claimed in either Claim 1 or Claim 2 wherein the means for generating predetermined graphics is arranged to provide representational graphics depicting a page or
30 pages turning over, after the selection of a required operational mode or pages within a mode and before the display of representational graphics associated with the selected mode or page.
- 35 4. Electronic personal organiser as claimed in Claim 1 wherein the transducer pad is translucent and

- 16 -

substantially overlays the display means such that a given portion of an image on the display lies substantially below the position on the pad at which the member co-operates with the pad to result in the electrical signals utilised in forming the given portion.

5. Electronic personal organiser as claimed in any preceding claim wherein the manually operable member is a stylus and the transducer pad is a membrane transducer pad operable to provide an electrical signal indicative of the position on the pad at which pressure, in excess of a predetermined threshold of pressure, is applied by said stylus.

6. Electronic personal organiser as claimed in Claim 1 and further comprising means for reading a smart card, the means for generating predetermined representational graphics being adapted to generate graphics in dependence on the information held on the smart card.

7. Electronic personal organiser as claimed in Claim 1 and further comprising means for transferring all information stored on the means for storing and means for receiving and storing all the information transferred.

8. An electronic personal organiser for electronically displaying simulated pages representative of a loose-leaf booklet arranged into various sections, comprising:

a display screen;

display means programmed to generate a display on the display screen representative of a menu displaying available sections of said booklet and

- 17 -

representative of printed information associated with different pages of said available sections;

memory means;

input screen means including an input tablet
5 for generating positional information when the latter is contacted by a stylus, whereby, when any one page available for display is displayed on the screen, handwritten information inputted via the input tablet is displayed on the display screen and is also stored
10 in said memory means for subsequent recall in association with said any one page; and

control means, associated with said display means and said memory means, operable to change the display on the display screen to switch the display
15 between the menu and pages of any one selected section of the menu and, when a page of a section is on display, to sequence through the pages of that section as required, any one page displayed on the display screen at any one time depicting both the
20 representative printed information associated with that page and any handwritten information associated with that page and stored in the memory means.

9. An electronic personal organisor according
25 to claim 8, wherein the input tablet is translucent and is mounted over the display screen so that information displayed on the display screen can be viewed through the input tablet.

30 10. An electronic personal organisor according to claim 9, wherein the control means includes control regions of the input tablet which, when contacted by a stylus, effect the said change of display on the display screen.

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11. An electronic personal organisor according

- 18 -

to claim 10, wherein said control regions are arranged to be positioned over visual cues generated by the display means for display on the display screen.

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12. An electronic personal organiser according to any one of the preceding claims, wherein said display means includes means for reading a programmable read-only memory device, e.g. a smart card.

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13. An electronic personal organiser according to any one of the preceding claims, comprising means for transferring the contents of said memory means to a back-up memory unit.

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14. An electronic personal organiser as claimed in any preceding claim, wherein the said display is a display of representational graphics.

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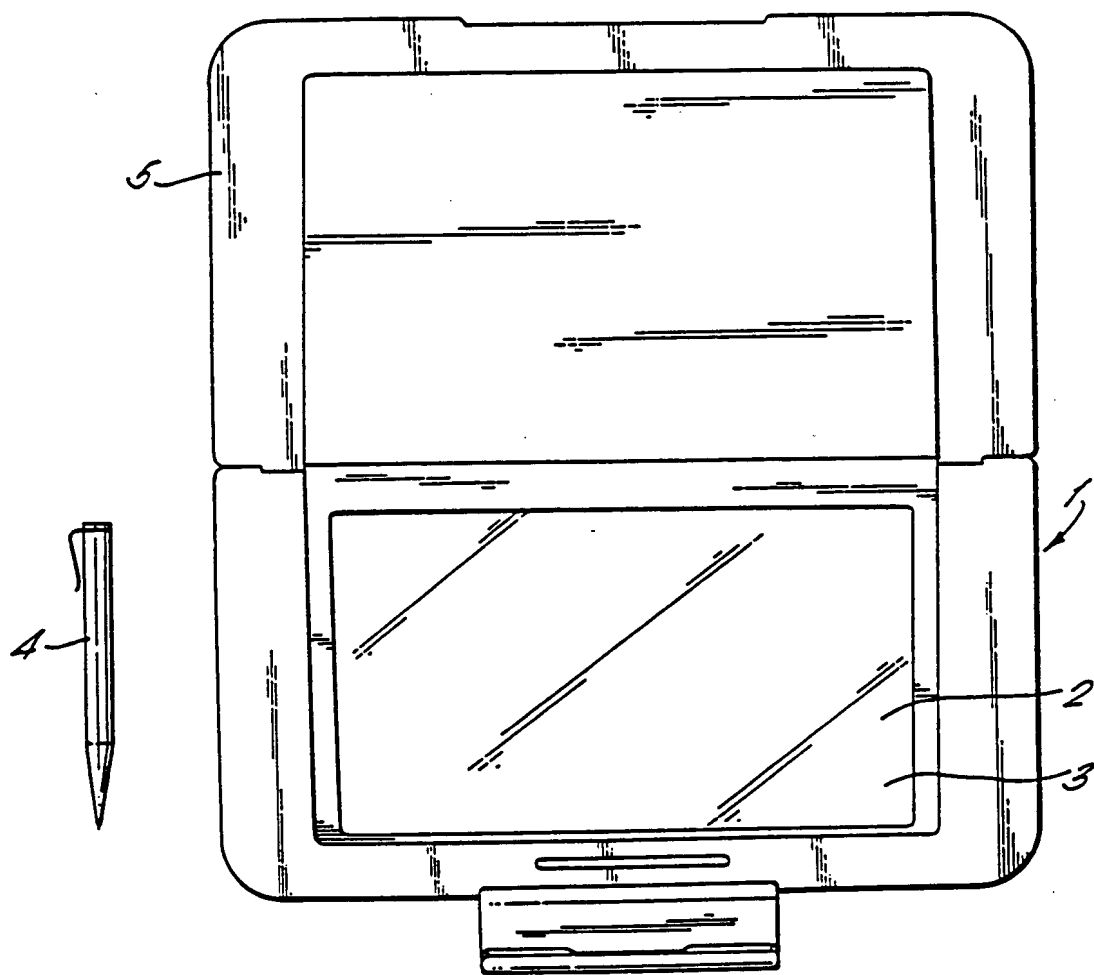
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unpublished researches indicating that the use of a

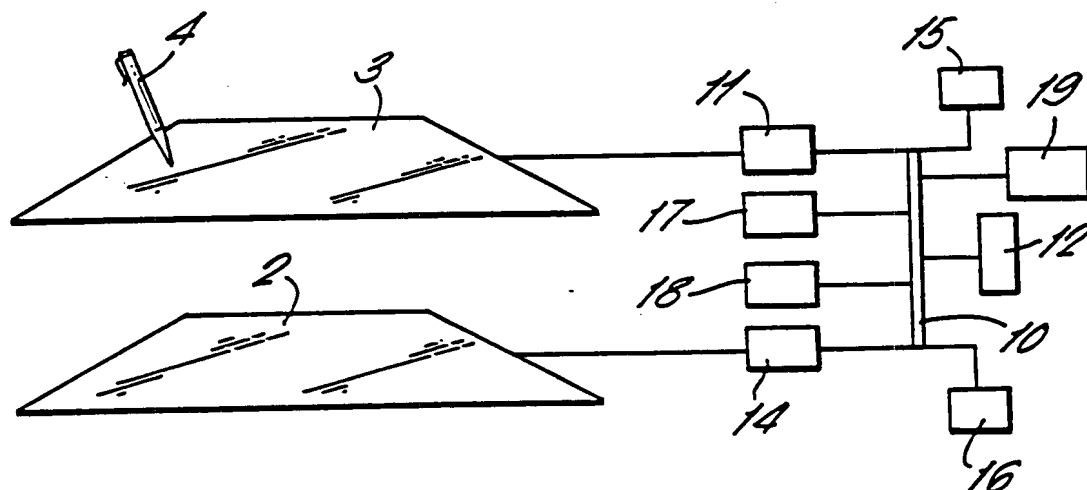
1/13

FIG. 1.



2/13

FIG. 2.



3/13

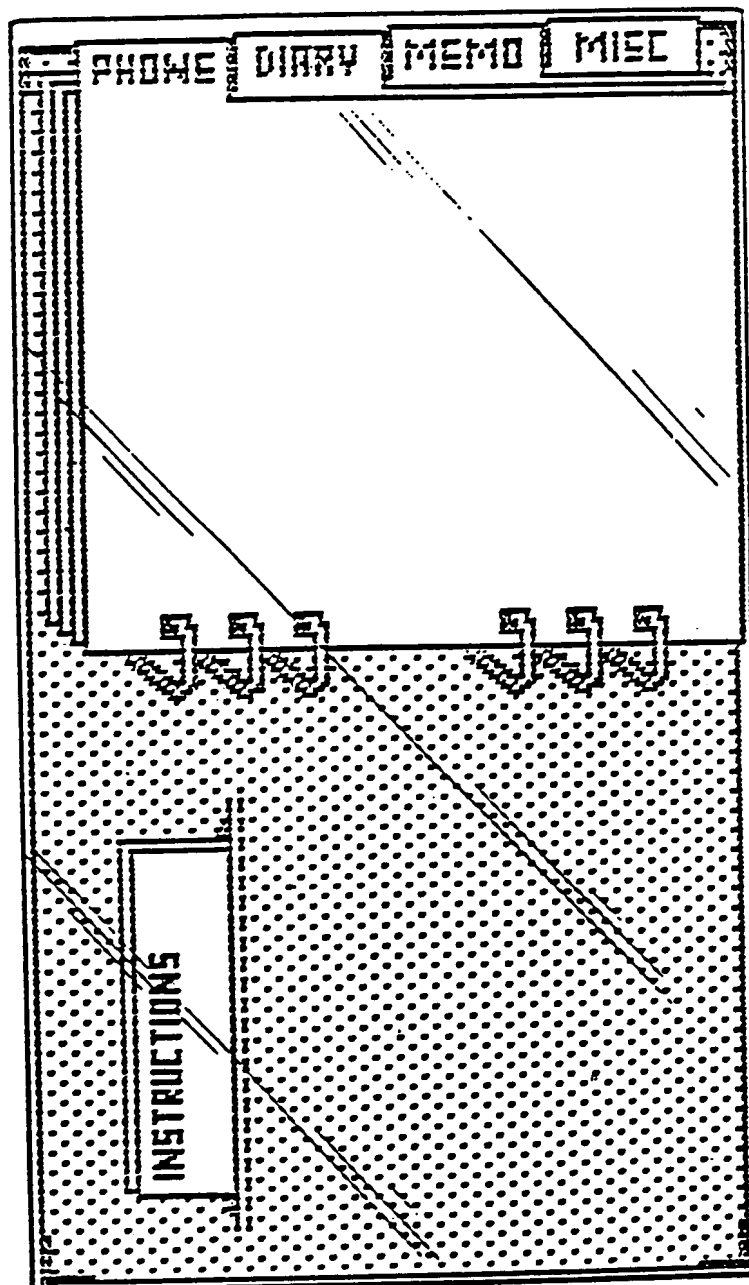


FIG. 3.

4/13

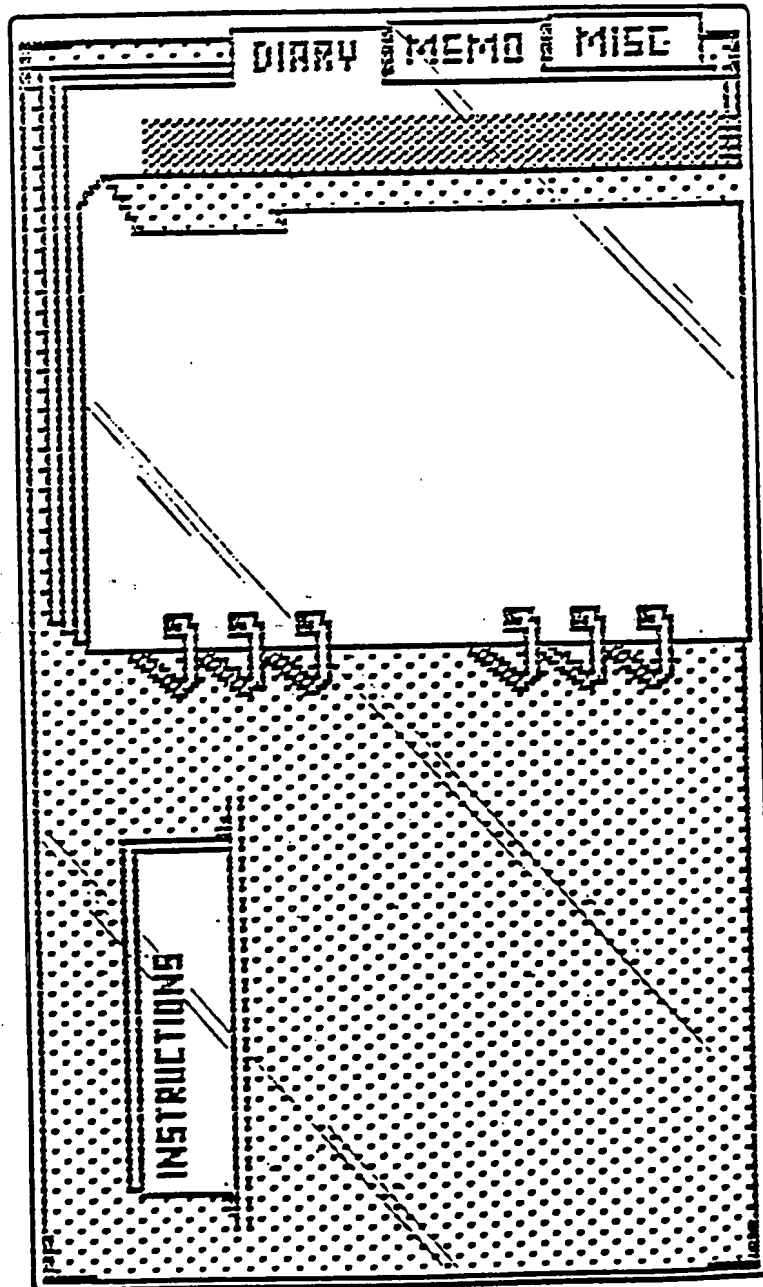


FIG. 3a.

5/13

CONTENTS		PAGES		ERASED	
MARCH 1988		MARCH 1988			
14 MONDAY		FRIDAY 13			
15 TUESDAY		SATURDAY 13			
16 WEDNESDAY		SUNDAY 20			
17 THURSDAY		NOTES			

FIG. 4.

6/13

CONTENTS		PAGES		ERASER	
MARCH 1988				MARCH 1988	
14 MONDAY				15 FRIDAY 25	
15 TUESDAY				16 SATURDAY 26	
16 WEDNESDAY				17 SUNDAY 27	
17 THURSDAY				NOTES	

FIG. 4a.

7/13

[illegible]

FIG. 4b.

8/13

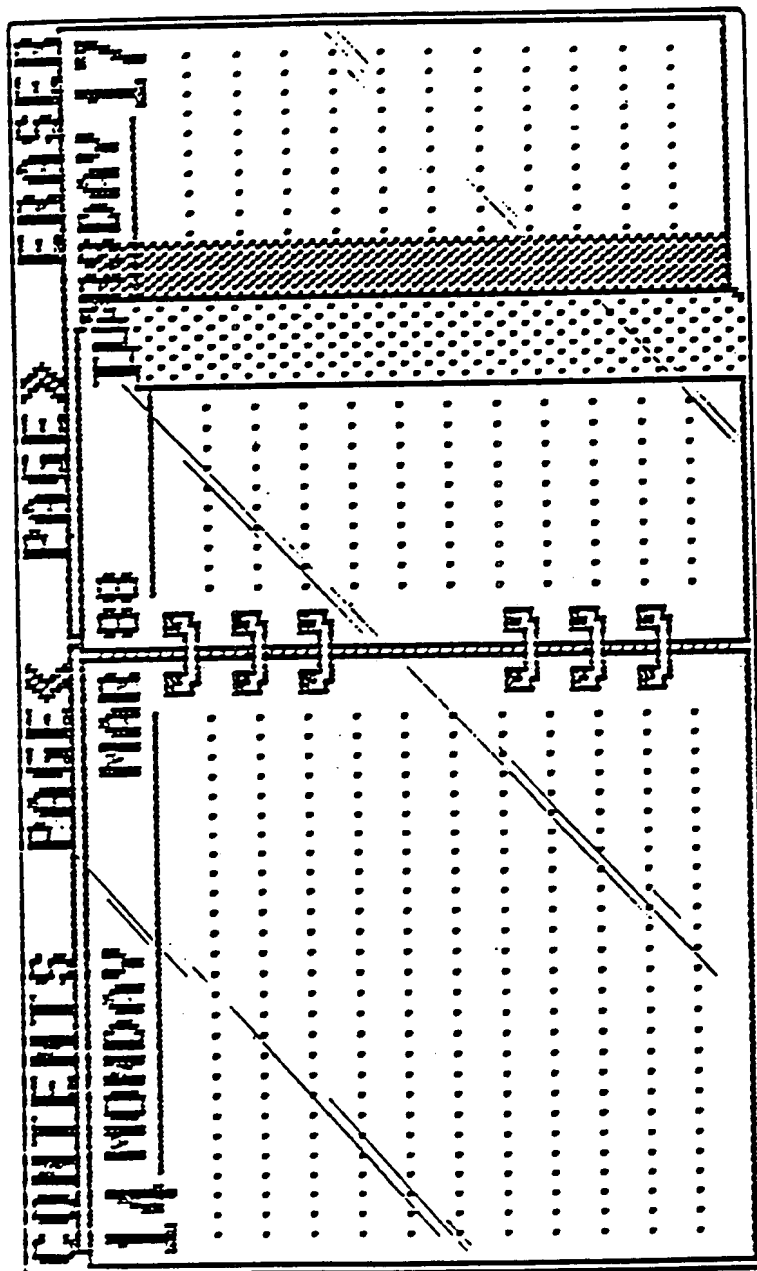


FIG. 4C.

9/13

[illegible]

10/13

CONTENTS		PAGES		PAGE		ERASER	
NAME		TELEPHONE		AB		CD	
						EF	
						GHI	
						JKL	
						MNO	
						PQR	
						STU	
						VWX	
						YZ	

FIG. 5a.

11/13

MEMO	CONTENTS	PAGES	PAGES	INDEX
1	MEMO	1	1	1
2				
3				
4				
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FIG. 6.

SUBSTITUTE SHEET

12/13

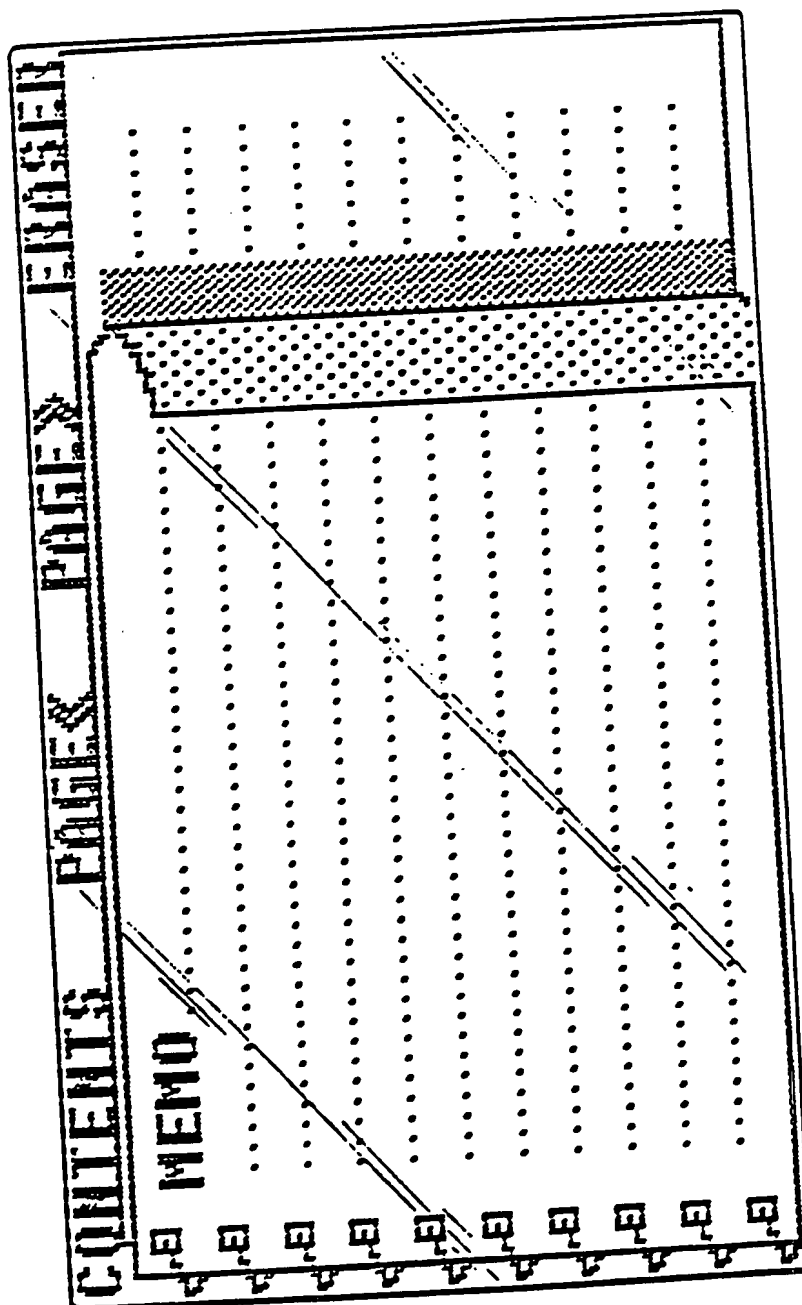
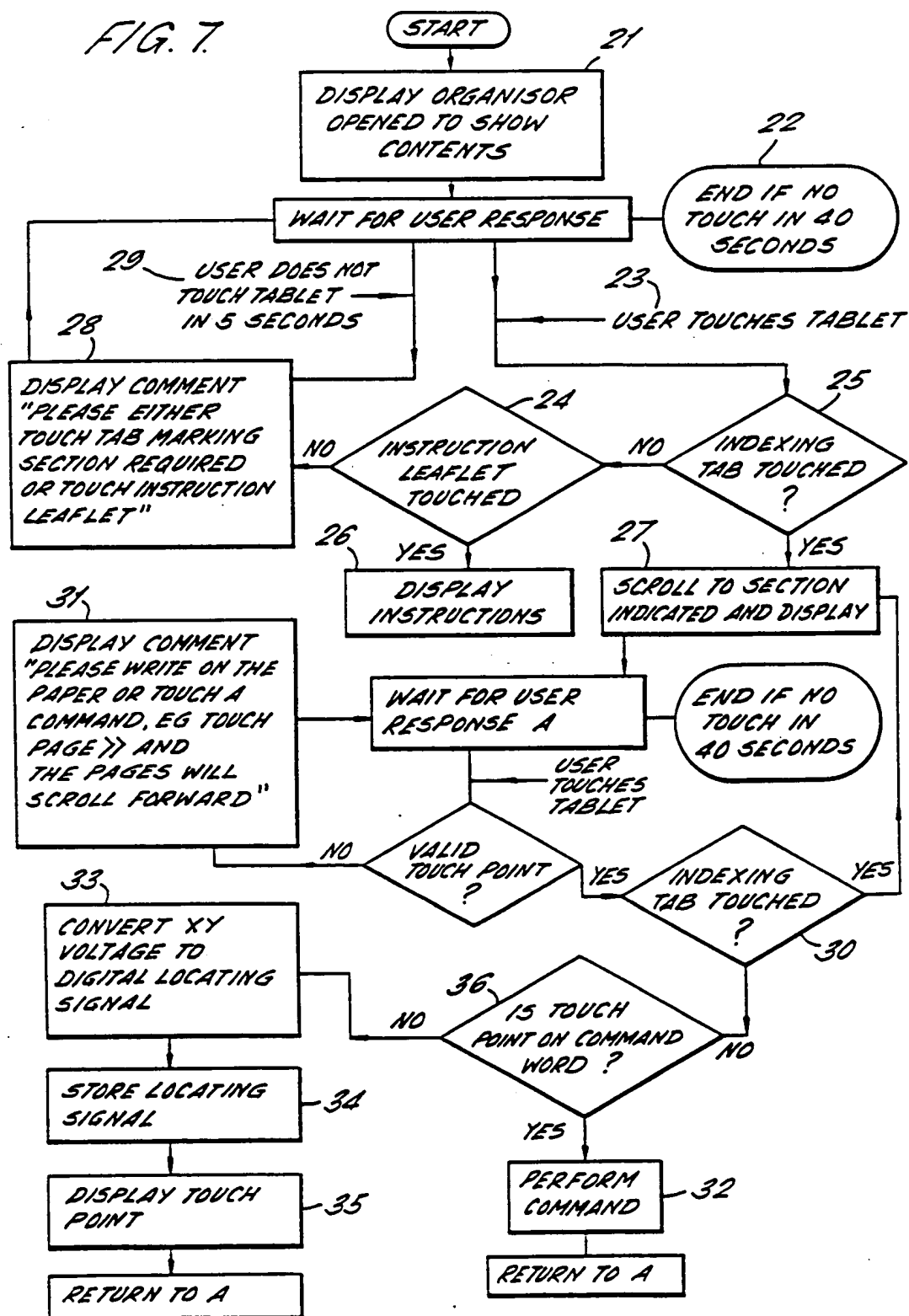


FIG. 6a.

13/13

FIG. 7



INTERNATIONAL SEARCH REPORT

International Application No PCT/GB 88/00666

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) *		
According to International Patent Classification (IPC) or to both National Classification and IPC		
IPC ⁴ G 06 F 3/033		
II. FIELDS SEARCHED		
Minimum Documentation Searched ⁷		
Classification System	Classification Symbols	
IPC ⁴	G 06 F	
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched ⁸		
III. DOCUMENTS CONSIDERED TO BE RELEVANT ⁹		
Category ¹⁰	Citation of Document, ¹¹ with Indication, where appropriate, of the relevant passages ¹²	Relevant to Claim No. ¹³
Y	US, A, 4649499 (SUTTON ET AL) 10 March 1987, see column 1, line 14 - column 3, line 5 and figures 1-3 ---	1-14
Y	DE, A1, 2537400 (BRAUN ET AL) 24 February 1977, see page 4, lines 11-16 ---	6,12
Y	Patent Abstract of Japan, abstract of JP 58-86674, published 1983-05-24 ---	1-14
Y	Patent Abstract of Japan, abstract of JP 58-14247, published 1983-01-27 -----	4,9
<p>* Special categories of cited documents: ¹⁸</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>"A" document member of the same patent family</p>		
IV. CERTIFICATION		
Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report	
19th October 1988	22 NOV 1988	
International Searching Authority	Signature of Authorized Officer	
EUROPEAN PATENT OFFICE	P.C.G. VAN DER PUTTEN	